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Niwaella brevifasciata, a New Cobitid Fish (Cypriniformes: Cobitidae) with a Revised Key to the Species of *Niwaella*

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Abstract A new cobitid, *Niwaella brevifasciata* is described from 17 specimens collected in small streams near the southwestern coast of Korea. It is distinguishable from congeners by the following characters: lower sides of body with 13 to 19 short vertical bars; mouth with relatively longer barbels and well-developed mental lobes; dorsal fin origin more anterior, between 55.3% and 60.3% SL; vertebral number fewer, 43 to 45; branched anal fin rays fewer, 4. A key to species of *Niwaella* and a brief discussion of the evolutionary history of the genus are included.

Nalbant (1963) erected the genus *Niwaella* (type species *Cobitis delicata* Niwa, 1937) separating it from other cobitoid genera on the basis of a small head and sucker-like mouth with small barbels and the absence of a lamina circularis on the pectoral fin in males. Although Bânârescu and Nalbant (1968) recognized *C. multifasciata* Wakiya and Mori, 1929 as a second species of *Niwaella*, no reasons were given. However Sawada and Kim (1977) substantiated the transfer of *C. multifasciata* from *Cobitis* to *Niwaella* noting the position of the dorsal fin as well as the agreement of the species with the diagnosis of *Niwaella*. To date only the two species of *Niwaella* have been reported.

Recently, cobitid specimens found in small streams flowing to the southwestern coast of Korea have been determined as representing a third species assignable to *Niwaella*. It is described herein and compared with related species. A key to the species of *Niwaella* is provided.

Material and Methods

Counts and measurements followed Hubbs and Lagler (1964), except for caudal peduncle depth, including height of the dorsal and ventral crests. The last two elements of the dorsal and anal fins were counted as one ray. Vertebral counts were from radiographs and include four components associated with the Weberian apparatus. Measurements were taken by dial caliper under a dissecting microscope. The sex of the specimens was determinated by direct examination of the gonads. Specimens were deposited at the Department of Biology, Chonbuk National University, Chonju, Korea (CNUC) and National Science Museum, Tokyo, Japan (NSMT).

Niwaella brevifasciata sp. nov.

(New Korean name: Jom-susuchi)

(Figs. 1–3; Table 1)

Holotype. CNUC 19907, male, 41.9 mm SL, Koûp stream, Yamag-ri, Pungyang-myon, Kohûng-gun, Chollanam-do, Korea (34°34′06″N, 127°14′46″E), I.-S. Kim and W.-O. Lee, April 2, 1994.

Paratypes. CNUC 19909, male, 39.2 mm SL, and CNUC 19900–19902, 3 females, 47.5–55.3 mm SL, collection date as for holotype; CNUC 19889–19890, 19894, 3 females, 52.4–59.9 mm SL, and NSMT-P 46666–46668, 3 females, 51.8–53.9 mm SL, small stream on Kôgum Island, Sinpyong-ri, Kumsan-myon, Kohûng-gun, Chollanam-do, Korea (34°28′44″N, 127°12′04″E), W.-O. Lee, June 14, 1994; CNUC 18943, 18948, and 18957, 3 males, 34.4–36.0 mm SL, and CNUC 18950–18952, 3 females, 39.0–45.2 mm SL, Kumo Island, Dumo-ri, Nam-myon, Yochon-gun, Chollanam-do, Korea (34°31′24″N, 127°45′00″E), I.-S. Kim and W.-O. Lee, August 3, 1993.

Diagnosis. *Niwaella brevifasciata* sp. nov. is distinguishable from its congeners by the following characteristics: color pattern on lower body sides consisting of 13 to 19 short vertical bars; barbels relatively longer; dorsal fin origin more anterior, between 55.3% to 60.3%; vertebral number fewer, 43 to 45; branched anal fin rays fewer, 4; distal margin of caudal fin slightly rounded; caudal peduncle with strong dorsal and ventral crests.

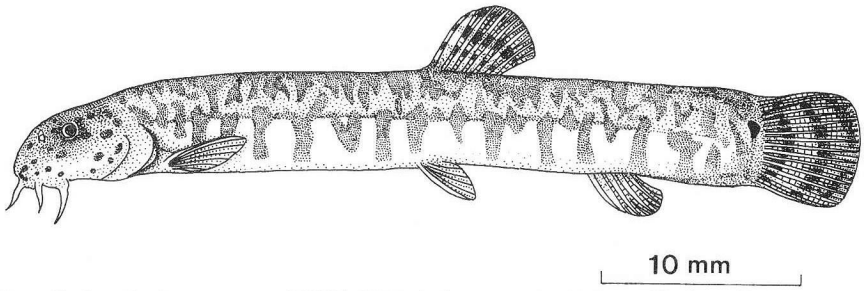

Fig. 1. *Niwaella brevifasciata* sp. nov., CNUC 19907, holotype, male, 41.9 mm SL, from Koûp stream, Kohûng Peninsula, Korea.

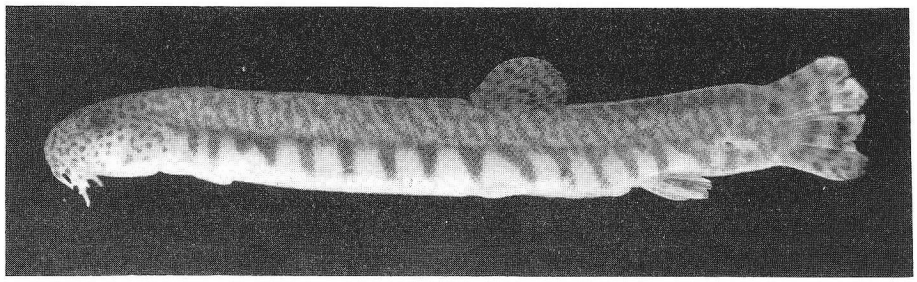

Fig. 2. *Niwaella brevifasciata* sp. nov., CNUC 19890, paratype, female, 56.2 mm SL, from Kôgum Island, Korea.

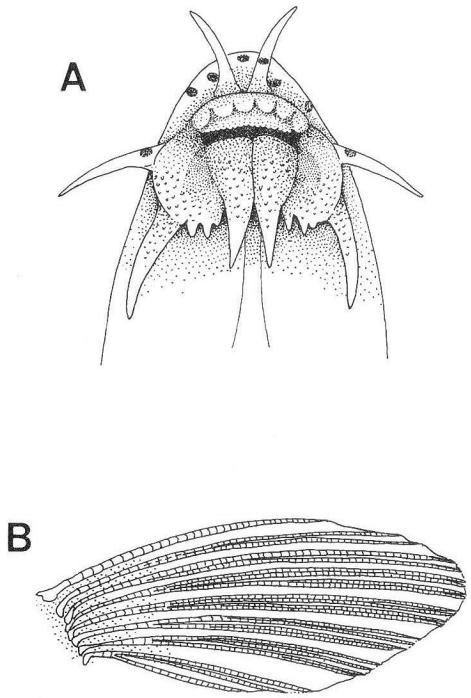

Fig. 3. Mouth part and pectoral fin of *Niwaella brevifasciata* sp. nov. A) Mouth part; B) pectoral fin of male.

Description. Dorsal fin rays iii, 6. Anal fin rays iii, 4. Pectoral fin rays i, 7. Pelvic fin rays i, 4–5. Caudal fin rays 8+8. Gill rakers on first arch 12–13. Vertebrae 23–24+20–21.

Body elongated laterally compressed (Fig. 1; Table 1). Head small, slightly compressed with blunt snout. Nostrils double on each side, closer to eye than snout, anterior nostril with short tube. Eye small, on upper lateral surface intermediate between snout and gill opening. Interorbital space narrow, convex. Distal part of suborbital spine strongly curved, bifid.

Mouth small, inferior, with fleshy lips; lower lip divided with two well-developed lobes; upper lip with weak transverse wrinkles on surface, well separated from upper jaw. Barbels 3 long pairs, first on rostral, second on maxillae and third on maxillo-mandibular; third barbel 1.5 to 2.0 times eye diameter.

Dorsal fin origin almost directly above pelvic fin origin, predorsal distance 55.3% to 60.3% of SL. Distal margin of dorsal fin more or less straight, that of caudal fin slightly rounded. Caudal peduncle shorter, well-developed crests dorsally and ventrally.

Body covered with minute oval scales with large focal area. Lateral line short, not exceeding length of pectoral fin.

Largest recorded size 59.9 mm SL.

Color in formalin.—Body pale yellow to light brown with dark brown markings. First zone of pigmentation (see Gambetta, 1934) comprising a series of 17–21 dark brown, saddle-like blotches. Second and third zones continuous with irregular brownish speckles. Fourth zone with 13–19 dark brown vertical bars, narrower than interspaces. A conspicuous black spot on upper part of caudal base. Head uniformly spotted, lacking a dark oblique line from snout to eye. Dorsal and caudal fins with 2 or 3 rows of brown dots. Anal, pectoral, and pelvic fins transparent, but sometimes dusky with diffuse pigment spots. Peritoneum appearing black or pigmented with black or dark brown chromatophores.

Sexual dimorphism.—Not obvious in external morphology. Males are possibly smaller than females.

Distribution. The new species was found in small streams flowing to the southern coast of Kohûng and its two adjacent islands, Kôgum Island of Kohûng-gun, and Kumo Island of Yochon-gun, Chollanam-do, Korea (Fig. 4).

Ecological notes. The species inhabits the pebble-covered bottoms of shallow, quick flowing streams, less than 80 cm deep and about 1–3 m wide, for a short distance about two to three kilometers upstream from the mouth.

The stomachs of adult specimens contained insect larvae, algae and vegetal remains. A dissected female, 52.4 mm SL (CNUC 19894) collected in June 14, 1994, carried 54 eggs, 1.30–1.45 mm in diameter.

Etymology. The specific name "brevifasciata" is from Latin brevis meaning "short," and Latin fasciatus meaning "banded," in reference to the lateral body coloration of the species.

Discussion

Niwaella brevifasciata sp. nov. closely resembles *Cobitis longicorpus* and *C. koreensis* from Korea in the lateral body color pattern and morphological features of the mouth. It is here included in *Niwaella* owing to the lack of a lamina circularis on the pectoral fin base in males and a dark oblique line from the snout to the eye, and on the basis of some proportional characters, but is distinguished from the two other species of that genus by its color pattern and long barbels. The mosaic character

Table 1. Proportional measurements of *Niwaella brevifasciata* sp. nov., expressed as percentage of standard length or head length

	Holotype	Paratypes (16 specimens)		
		Mean	Range	SD
Standard length(mm)	41.9	47.0	34.4–59.9	7.87
In standard length				
Head length	17.9	17.9	16.5–18.9	0.67
Body depth	11.2	11.8	10.3–12.7	0.85
Predorsal length	57.8	57.4	55.3–60.3	1.42
Prepectoral length	19.1	18.8	17.4–20.0	0.66
Prepelvic length	54.9	55.4	52.9–58.7	1.80
Preanal length	76.4	79.4	77.3–81.0	1.06
Pectoral-pelvic length	36.3	36.8	32.5–39.8	2.12
Pelvic-anal length	22.2	23.4	20.4–25.4	1.39
Caudal peduncle length	16.7	15.3	14.3–16.4	0.58
Caudal peduncle depth	11.2	11.7	10.5–13.1	0.65
Pectoral fin length	9.1	8.8	7.4–10.8	0.99
Caudal fin length	14.6	14.4	12.3–15.9	1.17
Base of dorsal fin	7.4	7.9	6.8– 8.9	0.63
In head length				
Snout length	44.0	45.1	41.5–48.4	2.02
Eye diameter	17.3	17.3	14.7–18.8	1.24
Interorbital length	20.0	21.0	18.5–25.8	2.15
3rd barbel length	38.7	31.1	25.3–40.0	3.81

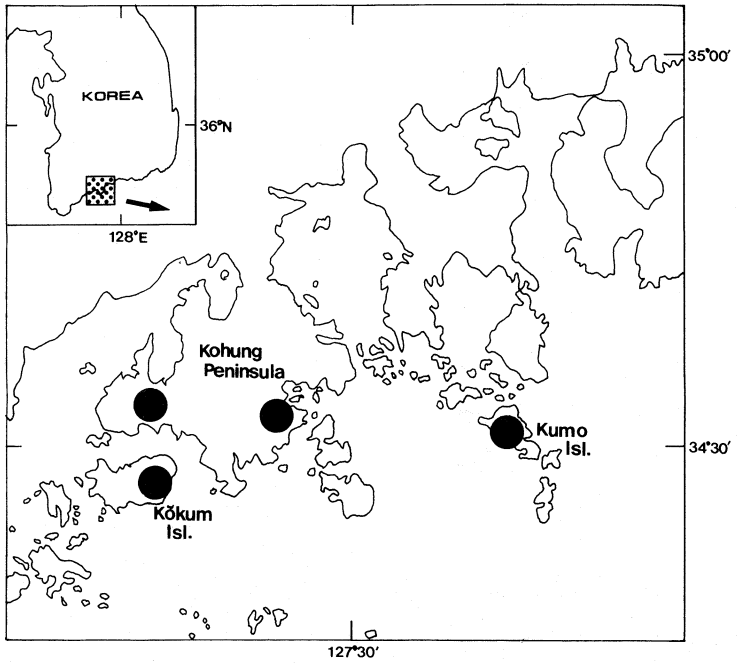

Fig. 4. Map showing the localities of *Niwaella brevifasciata* sp. nov. (●) from southwestern Korea.

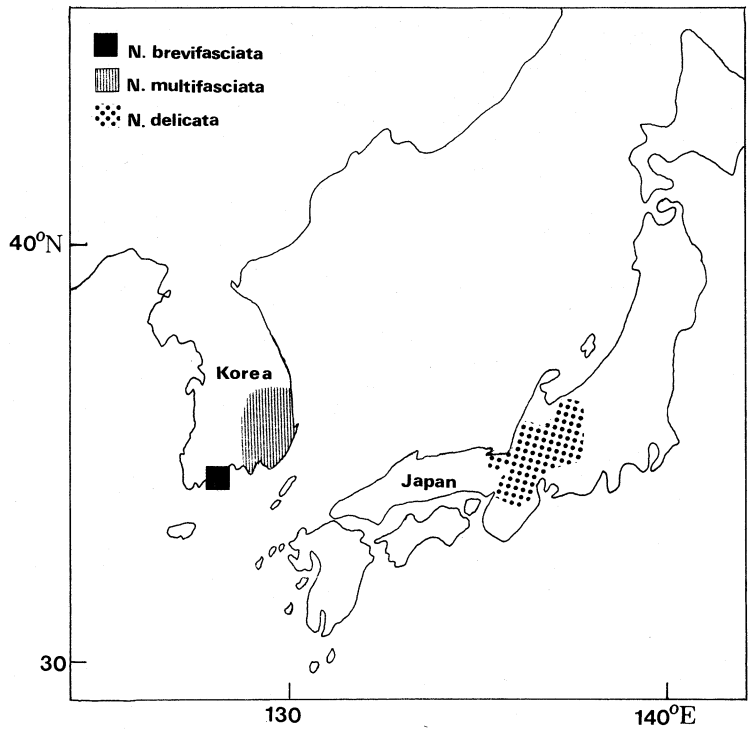

Fig. 5. Distribution of the genus *Niwaella* of family Cobitidae.

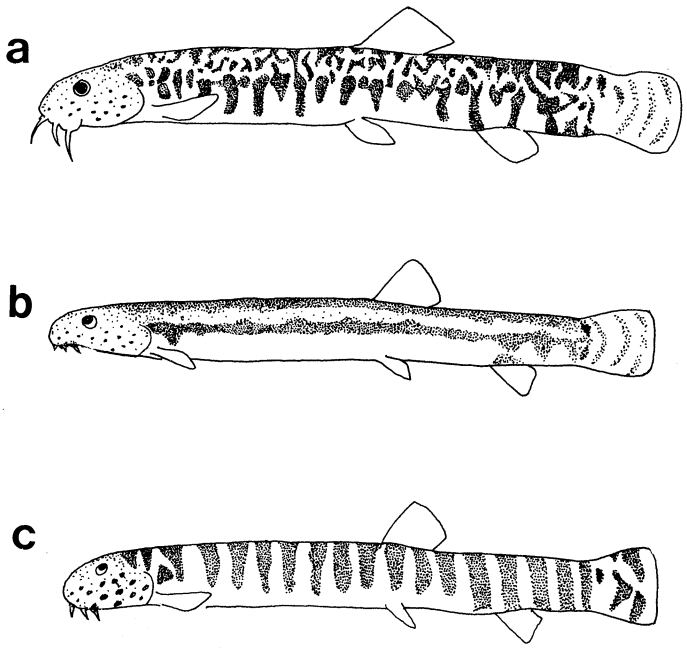

Fig. 6. Color patterns of the genus *Niwaella*. a) *N. brevifasciata*; b) *N. delicata*; c) *N. multifasciata*.

appearance of the new species may indicate an initial evolutionary trend towards typical *Niwaella* from the more generalized *Cobitis*.

The geographic range of *N. brevifasciata* is very narrow in the southwestern coastal area of Korea (Fig. 5), being disjunct with the ranges of *N. multifasciata* and *N. delicata*. Nalbant (1963) proposed that *Niwaella* was recently separated from *Cobitis*, probably in the upper Neogene, and was thus characterised by more specialized characters. Based on the assumption that the ancestor of the subfamily Cobitinae originated in Southeast Asia (Sawada, 1982) and probably extended into Korea and Japan via the Paleo Hwangho River, it is likely that the three species of *Niwaella* might have arisen by subsequent geographical isolation.

Key to the species of *Niwaella*

1a. 13–19 brown vertical bars on sides of body . . 2
1b. A brown longitudinal stripe or a series of brown blotches along the mid-lateral body surface (Fig. 6b) . . . . . *N. delicata*
2a. Continuous or discontinuous vertical bars on entire side of body; barbels nearly equal to eye diameter (Fig. 6c) . . . . . *N. multifasciata*
2b. Vertical bars on lower sides of body only; barbels about twice eye diameter (Fig. 6a) . . . . . *N. brevifasciata* sp. nov.

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コイ目ドジョウ科の1新種 *Niwaella brevifasciata* の記載およびアジメドジョウ属の種の検索

金　益秀・李　完玉

韓国南西部海岸域の複数の小河川から得た17個体にもとづき，ドジョウ科の新種 *Niwaella brevifasciata*（新称，좀수수치）を記載した．本種は同属他種から以下の点で識別できる．体側下部には13–19本の短い横帯がある．口唇部に比較的長い口ヒゲと発達した肉質突起を持つ．背鰭は前方にあり，背鰭前長は標準体長の55.3–60.3%である．脊椎骨数は43–45，臀鰭分枝軟条は4本と少ない．アジメドジョウ属の種の検索を示し，アジメドジョウ属の進化について若干の論議を行った．

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